CLAIMS

1. An ocular lens material comprising a copolymer prepared by polymerization with heating of a monomer mixture and/or with irradiating a monomer mixture with ultraviolet ray by means of a molding method, said monomer mixture containing, as main components,

(A) a polysiloxane macromonomer in which a polymerizable group bonds to a siloxane main chain through at least one urethane bond, and which is represented by the formula (I):

$$A^1\text{-}U^1\text{-}(\text{-}S^1\text{-}U^2\text{-})_n\text{-}S^2\text{-}U^3\text{-}A^2 \qquad (I)$$

wherein A^1 is a group represented by the formula (II):

$$Y^{21}\text{-}Z^{21}\text{-}R^{31}\text{-} \qquad (II)$$

in which Y^{21} is acryloyl group, vinyl group or allyl group, Z^{21} is oxygen atom or direct bond, and R^{31} is direct bond or a linear, branched or aromatic alkylene group having 1 to 12 carbon atoms;

A^2 is a group represented by the formula (III):

$$\text{-}R^{34}\text{-}Z^{22}\text{-}\ Y^{22} \qquad (III)$$

in which Y^{22} is acryloyl group, vinyl group or allyl group, Z^{22} is oxygen atom or direct bond, and R^{34} is direct bond or a linear, branched or aromatic alkylene group having 1 to 12 carbon atoms, where Y^{21} in the formula (II) and Y^{22} in the formula (III) may be the same or different;

U^1 is a group represented by the formula (IV):

$$-X^{21}-E^{21}-X^{25}-R^{32}- \qquad (IV)$$

in which each of X^{21} and X^{25} is independently selected from direct bond, oxygen atom and an alkylene glycol group, E^{21} is -NHCO- group (in this case, X^{21} is direct bond, X^{25} is oxygen atom or an alkylene glycol group and E^{21} and X^{25} form urethane bond), -CONH- group (in this case, X^{21} is oxygen atom or an alkylene glycol group, X^{25} is direct bond and E^{21} and X^{21} form urethane bond) or a divalent group derived from a diisocyanate selected from a group of a saturated or unsaturated aliphatic diisocyanate, an alicyclic diisocyanate and an aromatic diisocyanate (in this case, each of X^{21} and X^{25} is independently selected from oxygen atom and an alkylene glycol group and E^{21} and X^{21}, E^{21} and X^{25} form two urethane bonds, respectively) and R^{32} is a linear or branched alkylene group having 1 to 6 carbon atoms;

each of S^1 and S^2 is independently a group represented by the formula (V):

$$-\left(-\underset{\underset{R^{24}}{|}}{\overset{\overset{R^{23}}{|}}{Si}}-O-\right)_K-\left(-\underset{\underset{R^{26}}{|}}{\overset{\overset{R^{25}}{|}}{Si}}-O-\right)_L-\underset{\underset{R^{28}}{|}}{\overset{\overset{R^{27}}{|}}{Si}}- \qquad (V)$$

in which each of R^{23}, R^{24}, R^{25}, R^{26}, R^{27} and R^{28} is independently an alkyl group having 1 to 6 carbon atoms, an alkyl group substituted with fluorine atom or phenyl group, K is an integer of 1 to 1,500, L is 0 or an integer of 1 to 1,499, and K + L is an integer of 1 to 1,500;

U^2 is a group represented by the formula (VI):

$$-R^{37}-X^{27}-E^{24}-X^{28}-R^{38}- \qquad (VI)$$

in which each of R^{37} and R^{38} is independently a linear or branched alkylene group having 1 to 6 carbon atoms, each of X^{27} and X^{28} is independently oxygen atom or an alkylene glycol group, and E^{24} is a divalent group derived from a diisocyanate selected from a group of a saturated or unsaturated aliphatic diisocyanate, an alicyclic diisocyanate and an aromatic diisocyanate (in this case, E^{24} and X^{27}, E^{24} and X^{28} form two urethane bonds, respectively);

U^3 is a group represented by the formula (VII):

$$-R^{33}-X^{26}-E^{22}-X^{22}- \qquad (VII)$$

in which R^{33} is a linear or branched alkylene group having 1 to 6 carbon atoms, each of X^{22} and X^{26} is independently selected from direct bond, oxygen atom and an alkylene glycol group, E^{22} is -NHCO- group (in this case, X^{22} is oxygen atom or an alkylene glycol group, X^{26} is direct bond and E^{22} and X^{22} form urethane bond), -CONH- group (in this case, X^{22} is direct bond, X^{26} is oxygen atom or an alkylene glycol group and E^{22} and X^{26} form urethane bond) or a divalent group derived from a diisocyanate selected from a group of a saturated or unsaturated aliphatic diisocyanate, an alicyclic diisocyanate and an aromatic diisocyanate (in this case, each of X^{22} and X^{26} is independently oxygen atom or an alkylene glycol group and E^{22} and X^{22}, E^{22}, and X^{26} form two urethane bonds, respectively); and

n is 0 or an integer of 1 to 10,

(B) a silicon-containing alkyl methacrylate,

(C) a hydrophilic monomer comprising

(C-1) N-vinylpyrrolidone and

(C-2) a hydrophilic monomer excepting N-vinylpyrrolidone (C-1), containing acryloyl group, vinyl group or allyl group;

(D) at least one monomer selected from an alkyl (meth)acrylate and a fluorine-containing alkyl (meth)acrylate; and

(E) a crosslinkable monomer comprising

(E-1) a crosslinkable monomer containing at least one group selected from acryloyl group, vinyl group and allyl group, and another group of methacryloyl group, and

(E-2) a crosslinkable monomer containing at least two methacryloyl groups,

wherein the weight ratio of the total of the polysiloxane macromonomer (A) and the silicon-containing alkyl methacrylate (B) to the hydrophilic monomer (C), the total weight of (A) and (B)/the weight of (C), is 30/70 to 70/30,

the weight ratio of the polysiloxane macromonomer (A) to the silicon-containing alkyl methacrylate (B), the weight of (A)/the weight of (B), is 25/75 to 75/25,

the weight ratio of N-vinylpyrrolidone (C-1) to the hydrophilic monomer (C-2), the weight of (C-1)/the weight of (C-2), is 50/50 to 100/0, and

the amount of the monomer (D) in the monomer mixture is 0 to 20 % by weight.

2. The ocular lens material of Claim 1, wherein at least one face or a part of at least one face of the copolymer is cut.

3. The ocular lens material of Claim 1, wherein the copolymer is prepared by polymerization with heating of the monomer mixture at 50° to 150°C for 10 to 120 minutes, and

in the monomer mixture, the weight ratio of the total of the polysiloxane macromonomer (A) and the silicon-containing alkyl methacrylate (B) to the hydrophilic monomer (C), the total weight of (A) and (B)/the weight of (C), being 30/70 to 70/30,

the weight ratio of the polysiloxane macromonomer (A) to the silicon-containing alkyl methacrylate (B), the weight of (A)/the weight of (B), being 25/75 to 75/25,

the weight ratio of N-vinylpyrrolidone (C-1) to the hydrophilic monomer (C-2), the weight of (C-1)/the weight of (C-2), being 50/50 to 100/0, and the amount of the monomer (D) in the monomer mixture being 0 to 20 % by weight.

4. The ocular lens material of Claim 1, wherein the copolymer is prepared by polymerization with irradiating the monomer mixture with ultraviolet ray having a wavelength of 365 nm in illuminance of 0.5 to 20 mW/cm^2 for 1 to 80 minutes, and

in the monomer mixture, the weight ratio of the total of the polysiloxane macromonomer (A) and the silicon-containing alkyl methacrylate (B) to the hydrophilic monomer (C), the total weight of (A) and (B)/the weight of (C), being 40/60 to 70/30,

the weight ratio of the polysiloxane macromonomer (A) to the silicon-containing alkyl methacrylate (B), the weight of (A)/the weight of (B), being 35/65 to 75/25,

the weight ratio of N-vinylpyrrolidone (C-1) to the hydrophilic monomer

(C-2), the weight of (C-1)/the weight of (C-2), being 50/50 to 100/0, and the amount of the monomer (D) in the monomer mixture being 0 to 20 % by weight.

5. The ocular lens material of Claim 1, wherein

the amount of the crosslinkable monomer (E) is at least 1 part by weight based on 100 parts by weight in total of the polysiloxane macromonomer (A), the silicon-containing alkyl methacrylate (B), the hydrophilic monomer (C) and the monomer (D), and

α which is the total number of moles of acryloyl group, vinyl group and allyl group in the hydrophilic monomer (C) and the monomer (D);

β which is the total number of moles of methacryloyl group in the silicon-containing alkyl methacrylate (B) and the monomer (D);

γ which is the total number of moles of acryloyl group, vinyl group and allyl group in the polysiloxane macromonomer (A) and the crosslinkable monomer (E); and

δ which is the total number of moles of methacrylol group in the crosslinkable monomer (E)

satisfy both conditions of α/γ = 20 to 80 and β/δ = 15 to 30.

6. The ocular lens material of Claim 5, wherein the ratio of α/γ to β/δ, $(\alpha/\gamma)/(\beta/\delta)$, is 1 to 3.

7. The ocular lens material of Claim 1, wherein the crosslinkable monomer (E-1) is allyl methacrylate and the crosslinkable monomer (E-2) is ethylene glycol dimethacrylate.

8. The ocular lens material of Claim 1, wherein the hydrophilic monomer (C-2) is at least one selected from acrylamide, N,N-dimethylacrylamide, N,N-diethylacrylamide, N-isopropylacrylamide, acryloylmorpholine, 2-hydroxyethyl acrylate, 2-dimethylaminoethyl acrylate and vinyl acetate.

9. The ocular lens material of Claim 1, wherein the hydrophilic monomer (C-2) is N,N-dimethylacrylamide.